Title:  "Branching Out"

Earth Science, 4th Grade

Skills:  Mapping, Compare and Contrast, Predicting, Testing, and Critiquing

Aim:  How does water flows through and connects watersheds?

Objectives:  Students will

     . build a model of a watershed

     . predict where water will flow in watersheds

     . describe drainage patterns in watersheds

Materials:  overhead transparency or copies of branching patterns, blue colored water, spray bottles, drawing paper and pencil, blue pencils, tracing paper or blank transparency sheets, copies of a local map showing rivers

Background:  When the ground is saturated or impermeable to water during heavy rains or snow melt, excess water flows over the surface of land as runoff.  Eventually, this water collects in channels such as streams.

The land area that drains water into the channels is called watershed or drainage basin.

Procedure:

     Warm Up-  Show students copies or an overhead of Branching Patterns (the outlines of a watershed's drainage pattern, a tree in winter, the human nervous system, and a road map).  Ask them what all the pictures  have in common.

     Steps-

     1.  Instruct students to wrap rocks with white scrap paper and lay them in a square or rectangular aluminum tray.  Place larger rocks near one end of the tray.  Cover the rocks snugly with plastic wrap.

     2.  Have students sketch a bird's eye view of the model.  They should mark points of higher elevation with "H"s and low spots with "L"s.  To identify possible ridgelines, connect the "H"s.

     3.  Tell students that the model will soon experience a rainstorm.  Where do they think water will flow and collect in the model?  Have them sketch predictions on their drawings.  Show them crevices in the model and possible locations of watersheds.

     4.  Spray blue colored water over the model and note where if flows.  Water may need to be sprayed for several minutes to cause a continual flow.  Assist students in identifying branching patterns as water from smaller channels merge into larger streams.

     5.  Have students use blue pencil to mark on their drawings the actual branching patterns of water.  Some imagination and logic may be required.  Ask them to confirm the locations of watersheds by noting where water has collected in the model.

     6.  Have students determine if smaller watersheds overflow into larger ones.  Does all the water in the model eventually drain into one collection site (open watershed system)?  Does the model contain several closed watershed systems (collection sites that lack an outlet)?

     Wrap Up-

     Have students place a tracing paper or an overhead transparency over their drawings and draw the drainage pattern.  Compare the traced lines to the branching patterns presented during the Warm Up and contrast with drawings of other students.  Discuss how all the networks involve smaller channels merging and becoming larger.

     Provide each student with a copy of a local map.  Have students locate streams and rivers and note where smaller rivers flow together or merge into larger ones.  Ask them to encircle land areas they think drain into the rivers.

     Have them pick one river on the map and follow it's path into directions.  If all of the river is pictured, one direction should lead to the head waters or source (where the line tapers off).  In the opposite direction, the river will merge with another river or empty into a body of water.

     Have students write a story or draw a picture about a local river.  Have them describe how water moves to the river from surrounding land areas or tributaries and then flows to a larger body of water.

     Rubric-                             4                            3                                 2                            1

Sketch Predictions:   Detailed watershed model   Watershed model    Poor watershed model   Unclear

                                                                        lacks details

Test Predictions:       Results reflect drainage      Results missing      Poor results                   Unclear

                                patterns                            details                                                        results

Compare and Contrast:  Detailed analysis           Analysis lacks        Vague analysis              Unclear

                                                                       details                                                         analysis

Science Writing/Drawing:  Well written story        Story/drawing          Poor writing and            Unclear

                                                                        lacks details           or sketch                      writing and

                                                                                                                                         or sketch